

1994: Investigators at Fermilab discover evidence for sixth quark(top)

Fermilab: Fermi National Accelerator Laboratory, Illinois. 439 physicists, 35 institutions and 5 countries collaborated on this project.

Experiment:

A large amount of protons were smashed against anti-protons at high speeds and the top quark was produced.

Although, it was not 'physically' observed, the calculations for the collision provided evidence for the top quark.

Top quark

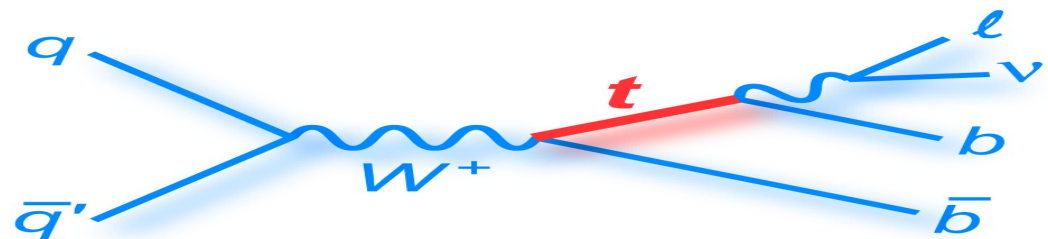
- Heaviest elementary particle known.
- Weighs as much as an atom of gold.
- Spin: $-1/2$, Mass: $174 \text{ GeV}/c^2$.
- Decays into the bottom quark (99.8%), strange quark (0.17%) and down quark (0.007%).
- Predicted lifetime: $5 \times 10^{-25} \text{ s}$.

Earlier Predictions:

The existence of the third generation of quarks was predicted by Makoto Kobayashi and Toshihide Maskawa in 1973. Their predictions were based on the charge parity violations in the kaon decay. They were awarded the Nobel prize for this discovery in 2008.

Discovery:

Finally, in 1995 the top quark was discovered using the collaborative efforts of *Collider Detector at Fermilab*(CDF) and the *DØ* detector. It was found to experience all four fundamental interactions: gravitation, electromagnetism, strong interactions, and weak interactions.



Sources:

<http://www.lbl.gov/Science-Articles/Archive/top-quark-first-evidence.html>
http://en.wikipedia.org/wiki/Top_quark

Prepared by: Sharat Bahl